Springfield – Greene County, Mo

Integrated Plan for the Environment

Environmental Priorities Task Force

Date: Tuesday, June17, 2014
4:30 to 6:30 p.m.

Location: Greene County Archives Building
1126 N Boonville Ave
Springfield, MO 65802

Map to meeting site on page 2

Meeting purpose:

- Discuss Air Quality Issues for Region.
- Develop policy statements & priorities

AGENDA

4:30 p.m.	Introductions and Overview	Fred Palmerton, Co-Chair
4:35 p.m.	Update on Integrated Plan Technical Work	Errin Kemper, City of Springfield
4:50 p.m.	Environmental Issues 102: Air Issues	Dave Fraley, City Utilities
5:40 p.m.	Policy Questionnaire Results & Priorities Exercise	Sheila Shockey, facilitator
6:25 p.m.	Closing Comments	Dan Hoy, Co-Chair
6:30 p.m.	Adjourn	

In accordance with ADA guidelines, if you need special accommodations when attending any City meeting, please notify the City Clerk's office at 864-1443 at least three days prior to the scheduled meeting.

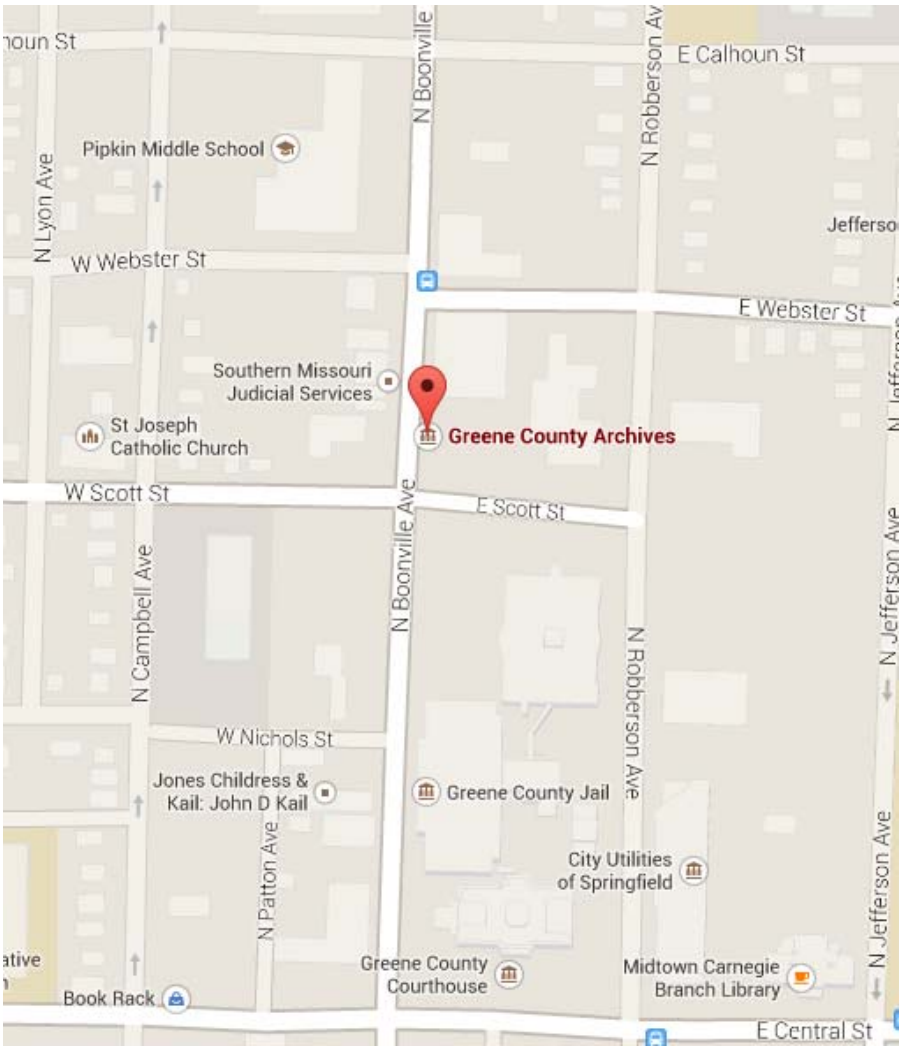
Handouts:

1. Background Information pages 3 - 20

Meeting Site:

Greene County Archives Building
1126 N Boonville Ave
Springfield, MO 65802

For assistance call 417.861.7102



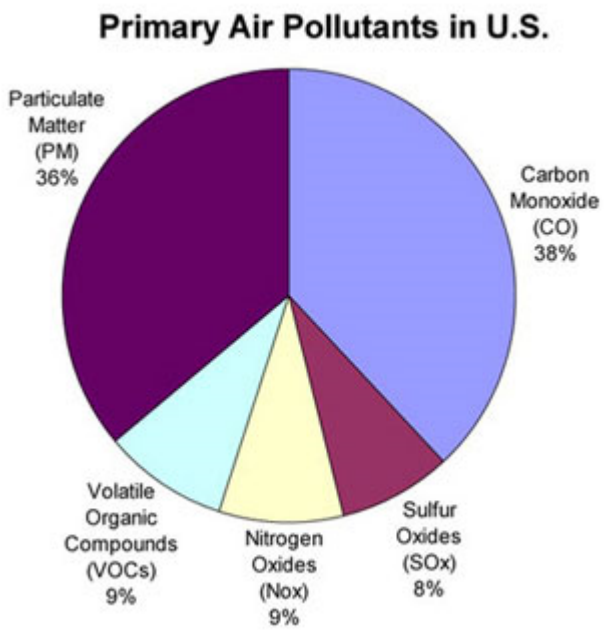
Air Quality Background Information

Air Pollution

What is polluting our air?

Air pollution comes from many different sources. Some sources are natural such as windblown dust and smoke from wildfires. Other sources are man-made such as emissions from automobiles, factories, power plants, construction equipment, small businesses and open burning. These air pollutants can be solids, liquids, or gases. Although we may not have control over natural sources of air pollution, we do have control over made-made sources. Federal, state and local regulatory agencies create air quality regulations to require the reduction of pollutants from man-made sources. However, regulations can only do so much. It is also up to individuals to understand how the decisions that they make, and the actions that they take, everyday can contribute to air pollution. Once we understand how we contribute to air pollution, we can effectively work to reduce it.

Figure 1: **Primary Pollutants in the US**



Six common air pollutants (also known as "criteria pollutants") are found all over the United States. They are ground-level ozone, particle pollution (often referred to as particulate matter), carbon monoxide, sulfur oxides, nitrogen dioxides, and lead. These pollutants can harm human, animal health and the environment, and cause property damage. Of these six criteria pollutants, particulate matter and ground-level ozone are the most widespread health threats. Figure 1 shows the percentage make up of primary pollutants in the air. Table 1 shows the various sources for selected pollutants in the state of Missouri for 2011.

Table 1: **Sources of Pollutants in State of Missouri, 2011** (By %)

Pollutant Name	Agriculture	Dust	Fuel Combustion	Industrial Processes	Misc.	Mobile	Solvent	Biogenics*
Particulates (PM2.5)	22.2%	68.1 %	4.5%	1.1%	1.2%	2.9%	0%	0%
Ammonia	95.2%		1.7%	0.2%	0.9%	2%	0%	0%
Carbon Monoxide			9.7%	5.9%	1.9%	71.9%	0%	10.6%
Lead			4%	83.6%	0.5%	11.6%	0.3%	0%
Nitrogen Oxides			19.7%	3.1%	0.3%	70.9%	0%	6.1%
Sulfur Dioxide			88%	11.4%	0.1%	0.5%	0%	0%
Volatile Organic Compounds			1.2%	0.5%	2.4%	8.5%	4.5%	82.9%

[*Biogenic denotes naturally occurring sources of biological origin. A striking example is the emission of organic isoprene from Missouri's oak forests.]

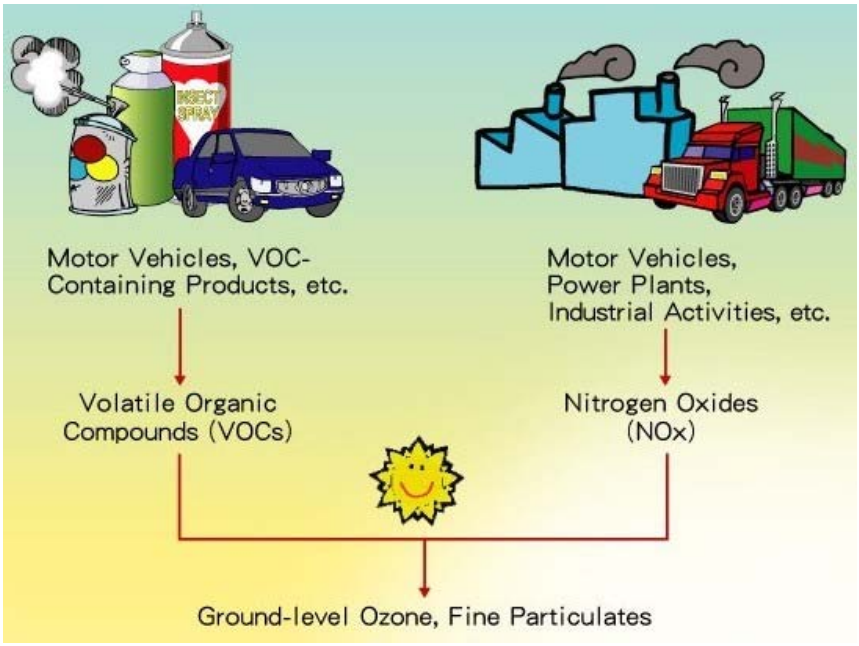
Ground-Level Ozone

Ground-level ozone is a pollutant that forms when emissions from man-made sources such as cars, lawn mowers and industry react with heat and sunlight. Ozone is invisible, so high concentrations can occur even when the air appears clear. For health reasons, the Environmental Protection Agency (EPA) sets a limit on how much ozone our air can contain. Areas that do not meet these standards must develop and carry out plans to reduce the amount of ozone in their air, which often means reducing emissions. The current national standard for ozone is not too exceed 75 parts per billion (ppb) over an average 8-hour period.

Ozone is a gas composed of three atoms of oxygen. Ozone occurs both in the Earth's upper atmosphere and at ground level. Ozone can be beneficial or detrimental, depending on where it is found. Ozone is beneficial in the upper atmosphere as it provides protection from the sun's ultraviolet rays. Ozone is harmful at ground level and can cause significant adverse health effects. Ground-level ozone is not emitted directly into the air. It is formed by a chemical reaction between volatile organic compounds (VOCs) and oxides of nitrogen (NOx) in the presence of sunlight. (See Figure 2). Emissions from industrial facilities, electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of NOx and VOCs.

Ground-level ozone pollution is of greater concern during the summer months in the northern hemisphere because strong sunlight and hot weather result in high ozone concentrations. For the Springfield region, ozone season is considered to be between April and October. Ground-level ozone levels from the combustion of fossil fuels tend to rise around mid-morning, several hours after rush-hour, and peak in the late afternoon.

Figure 2: **Ground-level Ozone Formation**



Particulate Matter

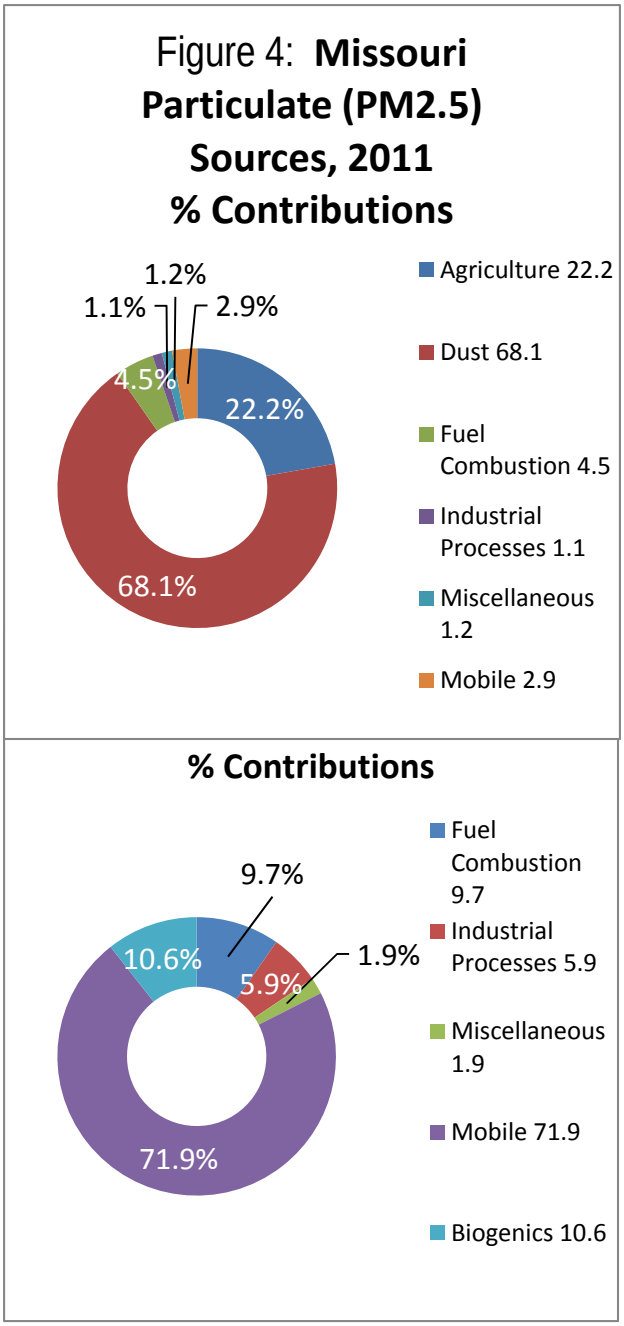
Smoke, soot, dust and dirt particles are included in a group known as particulate matter or particle pollution. Particulate matter (PM) is an airborne mixture of liquid droplets and solid particles made up of organic chemicals, metals, acids or dust particles. There are two groups of PM that matter the most since they can easily be inhaled. PM_{10}, are particulate matter smaller than 10 micrometers and are frequently found near roadways and dust-creating industries. Fine particles, or $PM_{2.5}$, are 2.5 micrometers and smaller. $PM_{2.5}$ hangs in smoke coming from burning oil, coal, wood or residential waste; smog, haze and vehicle exhaust. Size isn't the only difference. Each type of particle is made of different material and comes from different places. Figure 3 summarizes the differences.

Figure 3: **Differences in Particulate Matter**

Particular Matter : Composition and Sources		
	Course Particles (PM_{10})	Fine Particles ($PM_{2.5}$)
What they are	• Smoke, dirt and dust from factories, farming, and roads • Mold, spores, and pollen	• Toxic organic compounds • Heavy metals • Sulfates and Nitrates
How they're made	• Crushing and grinding rocks and soil, then blown by the wind	• Driving automobiles • Burning plants (brush and forest fires or yard waste) • Smelting (purifying) and processing metals

Both PM10 (big) and PM2.5 (small) particles can cause health problems; specifically respiratory health. Because the PM2.5 travels deeper into the lungs AND because the PM2.5 is made up things that are more toxic (like heavy metals and cancer causing organic compounds), PM2.5 can have worse health effects than the bigger PM10.

Figure 4. PM2.5 Sources for Missouri, 2011



Carbon Monoxide

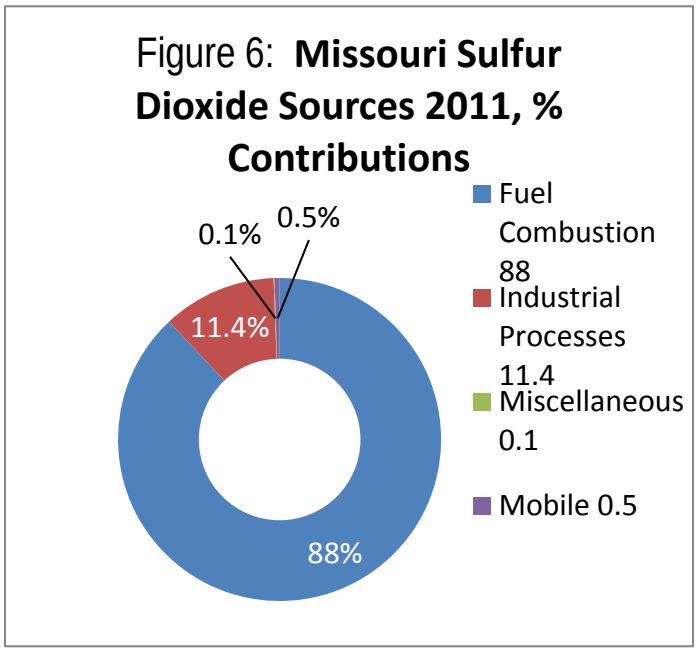
Carbon monoxide (CO) is a colorless, odorless gas produced by the incomplete combustion of fuels. The major source of CO in our community is motor vehicles. According to the U.S. EPA, air quality has greatly improved in recent years, but vehicles on the road—even newer, cleaner models—still account for at least 25% of air-polluting emissions nationwide. Carbon monoxide affects healthy and unhealthy people. Increased levels of carbon monoxide reduce the amount of oxygen carried by hemoglobin around the body in red blood cells. The result is that vital organs, such as the brain, nervous tissues and the heart, do not receive enough oxygen to work properly. For healthy people, the most likely impact of a small increase in the level of carbon monoxide is that they will have trouble concentrating. Some people might become a bit clumsy as their coordination is affected, and they could get tired more easily. People with heart problems are likely to suffer from more frequent and longer angina attacks, and they would be at greater risk of heart attack. Children and unborn babies are particularly at risk because they are smaller and their bodies are still growing and developing.

Figure 5 shows the contributors to carbon monoxide in Missouri for the year 2011.

Sulfur Oxides

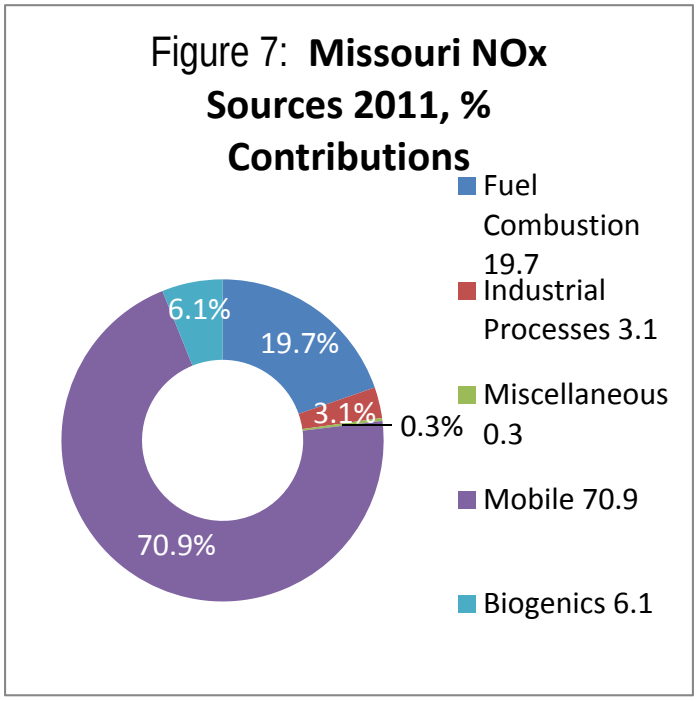
Sulfur dioxide is a gas from the sulfur oxides family. It is invisible and has a nasty, sharp smell like a struck match. It reacts easily with other substances to form harmful compounds, such as sulfuric acid, sulfurous acid and sulfate particles. About 99% of the sulfur dioxide in air comes from human sources. The main source of sulfur dioxide in the air is industrial activity that processes materials that contain sulfur, e.g. the generation of electricity from coal, oil or gas that contains sulfur.

Some mineral ores also contain sulfur, and sulfur dioxide is released when they are processed. Especially in Missouri, where lead sulfide (galena) is the State Mineral. In addition, industrial activities that burn fossil fuels containing sulfur can be important sources of sulfur dioxide.



Sulfur dioxide is also present in motor vehicle emissions, as the result of fuel combustion. Contributions of sulfur dioxide in Missouri are mostly from fuel combustion as illustrated in Figure __. Sulfur dioxide affects human health when it is breathed in. It irritates the nose, throat, and airways to cause coughing, wheezing, shortness of breath, or a tight feeling around the chest. The effects of sulfur dioxide are felt very quickly and most people would feel the worst symptoms in 10 or 15 minutes after breathing it in. Those most at risk of developing problems if they are exposed to sulfur dioxide are people with asthma or similar conditions.

Figure 6. Sulfur Dioxide Sources, Missouri 2011



Nitrogen Oxides

Nitrogen oxides, or NOx, is the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying properties. Many of the nitrogen oxides are colorless and odorless. However, one common pollutant, nitrogen dioxide (NO2) along with particles in the air can often be seen as a reddish-brown layer over many urban areas. Nitrogen oxides form when fuel is burned at high temperatures, as in a combustion process. The primary manmade sources of NOx are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels. NOx can

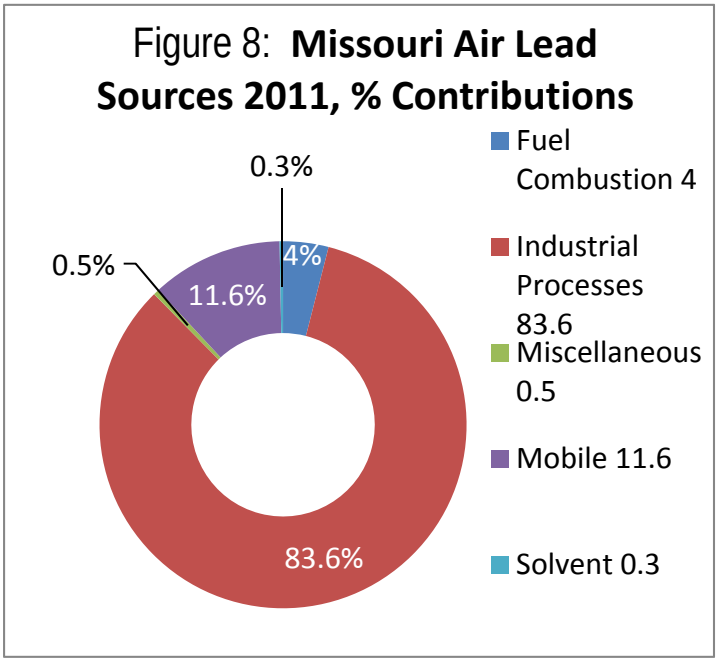
also be formed naturally. NOx causes a wide variety of health and environmental impacts because of various compounds and derivatives in the family of nitrogen oxides, including nitrogen dioxide, nitric acid, nitrates, nitric oxide, and nitrous oxide, a regulated greenhouse gas.

Figure 7 shows the contributions of NOx to air quality from all Missouri sources in 2011.

Lead

Lead is a soft metal that is found in air in the form of very small particles. Lead can get into the air naturally through soil erosion, volcanic eruptions, and sea spray. In the past, motor vehicles were the major contributor of lead emissions to the air. As a result of regulatory efforts to reduce lead in on-road motor vehicle gasoline, air emissions of lead from the transportation sector, and particularly the automotive sector, have greatly declined over the past two decades.

Figure 8: **Missouri Air Lead Sources 2011, % Contributions**



Major sources of lead emissions to the air today are ore and metals processing and piston-engine aircraft operating on leaded aviation gasoline. The highest air concentrations of lead are usually found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Lead in the air is a problem not only because people may breathe it in, but also because people, particularly children, can swallow lead dust that has settled onto surfaces like soil, dust, and water. Lead in soil and dust stays around for many years because it does not decay or decompose. Lead ingestion has been linked to several health issues and complications. Figure 8 Missouri Lead Sources 2011

What are the sources of air pollution?

The sources of pollution can be divided into the following categories:

Natural – Natural activities in the environment can actually cause air pollution.

Area – Smaller-size facilities that release lesser quantities of pollutants into the air. Area sources are defined as sources that emit less than 10 tons per year of a single air toxic, or less than 25 tons per year of a combination of air toxics. Though emissions from individual area sources are often relatively small, collectively their emissions can be of concern - particularly where large numbers of sources are located in heavily populated areas.

Stationary – These sources may release air pollution from equipment leaks, when materials are transferred from one location to another, or during discharge through emission stacks or vents

Mobile – Mobile source air pollutants are compounds emitted from highway vehicles and non-road equipment which are known or suspected to cause cancer or other serious health and environmental effects. Mobile sources are responsible for direct emissions of air pollution and contribute to precursor emissions which react to form secondary pollutants.

Following is a list of the man-made sources commonly polluting air in the United States:

Area

- Businesses (dry cleaners, auto body shops, printers, painting operations, gas stations, etc.)
- Homes (wood combustion, furnaces, paint and solvent use, etc.)
- Office buildings (heating sources, etc.)
- Wildfires
- Waste disposal (landfills)
- Agricultural sources (open burning, pesticide application, tilling, feedlots, etc.)

Stationary

Electric Generating Units (EGU):

- Coal-fired power plants
- Gas-fired power plants

Non-Electric Generating Units (Non-EGU):

- Factories
- Industrial and commercial boilers
- Chemical processing
- Large petroleum storage facilities
- Sewage treatment plants
- Mining and milling

Mobile

On-road:

- Cars
- Motorcycles
- Trucks
- Heavy-duty trucks (Semi-tractor trailers, dump trucks, etc.)

Non-road:

- Construction equipment (excavators, bull dozers, skid steers, etc.)
- Lawn and garden gasoline-powered equipment (lawn mowers, grass trimmers, chain saws, leaf blowers, chippers, etc.)
- Off-road motorcycles and ATV's
- Golf carts
- Snowmobiles
- Boats
- Farm equipment (tractors, sprayers, balers, etc.)

The air pollutants and relative amounts detected from mobile sources in Missouri are illustrated in Figure 9 and fuel combustion in Missouri 2011 in Figure 10.

Figure 9: **Missouri Mobile Pollutants, 2011, % Air Contribution**

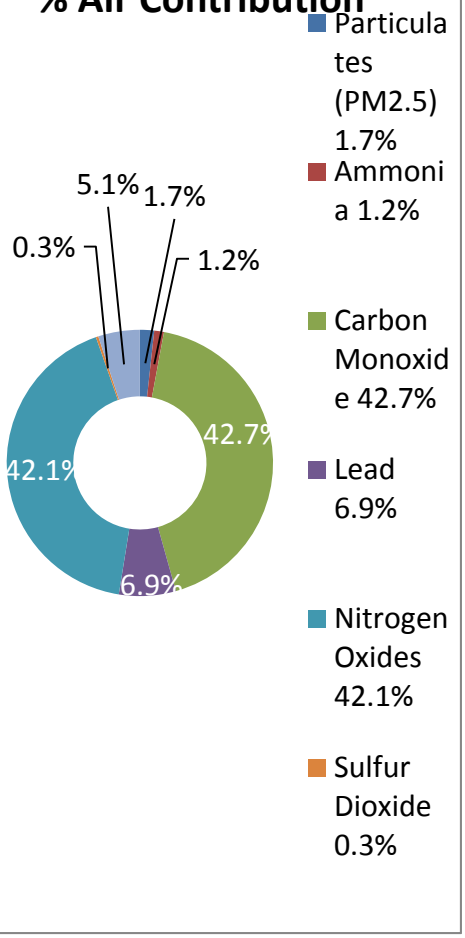
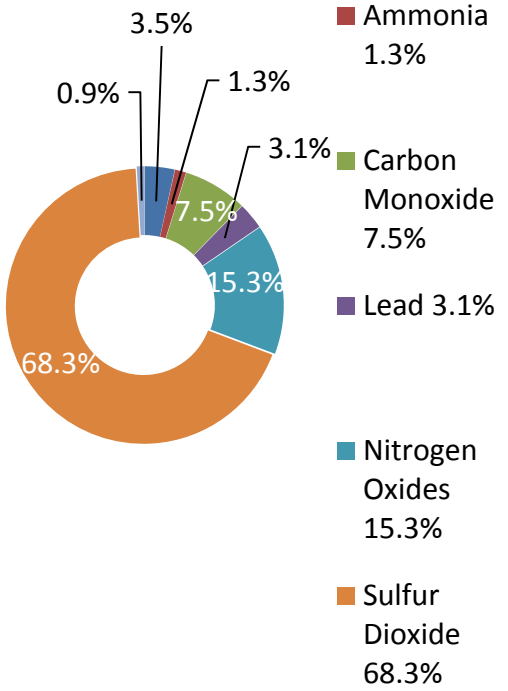


Figure 10: **Missouri Fuel Combustion, 2011, % Air Contribution**



Greenhouse gases

Greenhouse gases are substances that absorb the sun's UV rays and reemit them as infrared rays. The resulting infrared heat is trapped in the atmosphere and causes a warming effect similar to the glass in a greenhouse or a parked automobile. The most prevalent greenhouse gases are water vapor, carbon dioxide (CO_2), and methane. In one regard, this heat trapping is responsible for moderating global temperatures and making the earth's surface habitable. Scientists are now concerned, however, that a buildup in the concentrations of these gases could cause climate impacts in the coming decades. EPA recently began regulating greenhouse gas emissions under the Clean Air Act. To date, EPA has finalized rules on emissions from some mobile sources and on new stationary sources of fuel combustion. EPA has also proposed regulations on new, and more recently, existing fossil-fuel power plants.

While climate change is rightly perceived as a global issue, the steps EPA proposes to reduce greenhouse emissions could have the side effect of improving local air quality. For example, the mobile source standards

co-authored by EPA and the Department of Transportation will only be met by improving fuel economy. More miles per gallon, resulting in less fuel burned per trip, would simultaneously reduce CO_2 and criteria pollutant emissions alike. Similarly, the CO_2 emission standards proposed on June 2, 2014 calls for power plant efficiency upgrades, increased use of natural gas for generation, greater reliance on renewable energy sources, and a decreased growth rate for customer demand. All of these measures would tend to reduce NOx, SO_2, and other power plant emissions beginning in 2020. If EPA expands greenhouse gas rules to other industry sectors in the future, fuel-related emissions would decrease from those sources as well.

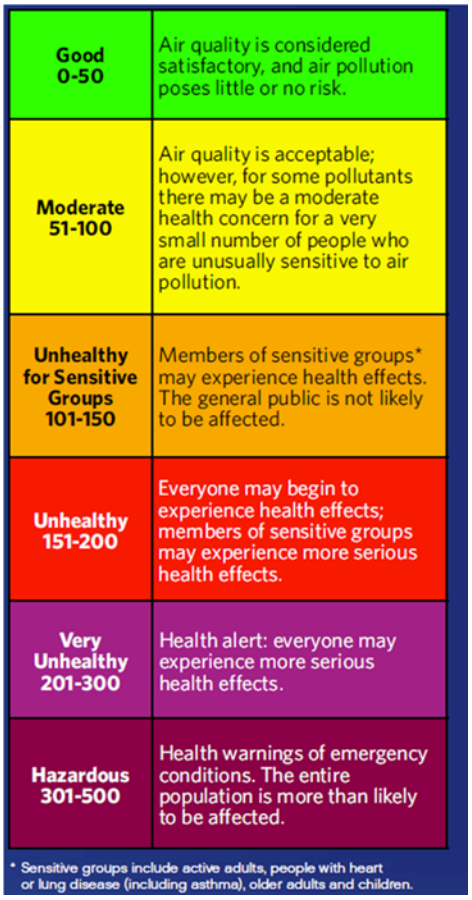
Springfield Air Quality

How do we know when the air quality is a health concern?

Air Quality Index

The Air Quality Index tracks ground-level ozone and particle pollution. The index is color coordinated and each color code corresponds to a different level of health concern. Air quality index values are divided into ranges, and each range is assigned a descriptor and a color code. The specific colors of the Air Quality Index makes it easier to understand where the air quality falls on the scale. Standardized public health advisories are associated with each AQI range. The United States Environmental Protection Agency (EPA) uses the following AQI chart in Figure11.

Figure 11: **EPA Air Quality Index**



Springfield Air Quality Index

Figure 12 is the mean Air Quality Index for Springfield for the years 1999 – 2009, compared to both the Missouri and U.S. Mean for the same timeframe.

The left coordinate shows the Air Quality Index. "Good" air days are in the 0-50 range on the chart. The lower the number the better the air quality.

Springfield's Average Air Quality Index generally follows the Missouri average and the US Mean. The general trend is improvement in air quality. It's important to remember these are averages so in given year, there could be several days when the air quality was not as healthy for individuals.

Figure 12: **Air Quality Index -- Springfield Missouri Mean vs. Missouri and US Mean, 1999 to 2009.**

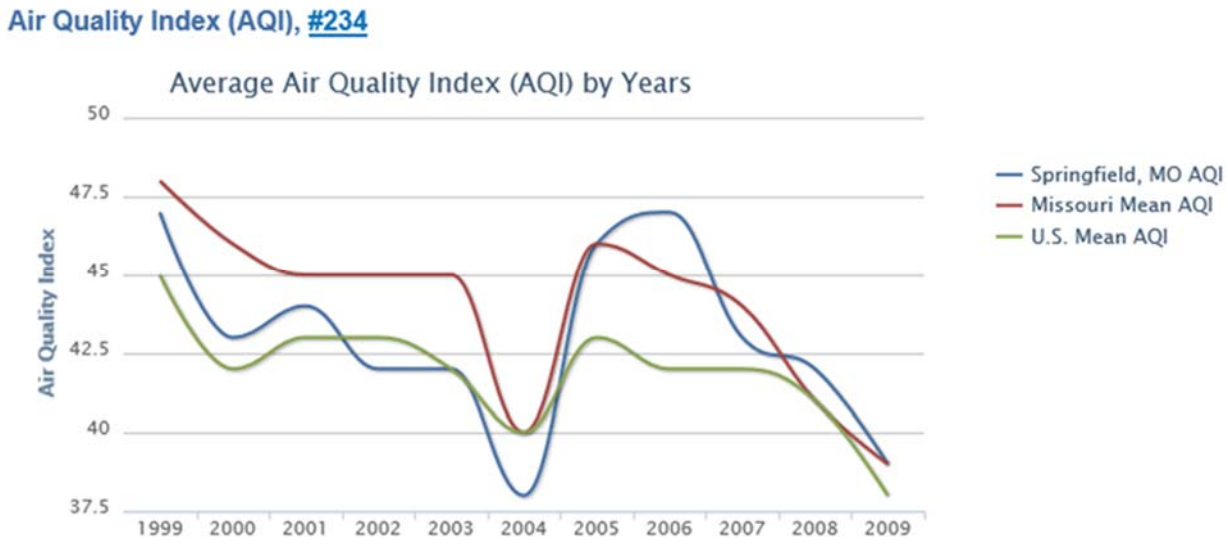


Figure 7: Source www.USA.com, Springfield Air Quality

Figure 13 represents the pollutants contributing to air quality for all Missouri processes. Missouri Industrial Processes release mostly lead into the environment. However, Figure 14 shows that lead is not a major contributor for the Springfield area.

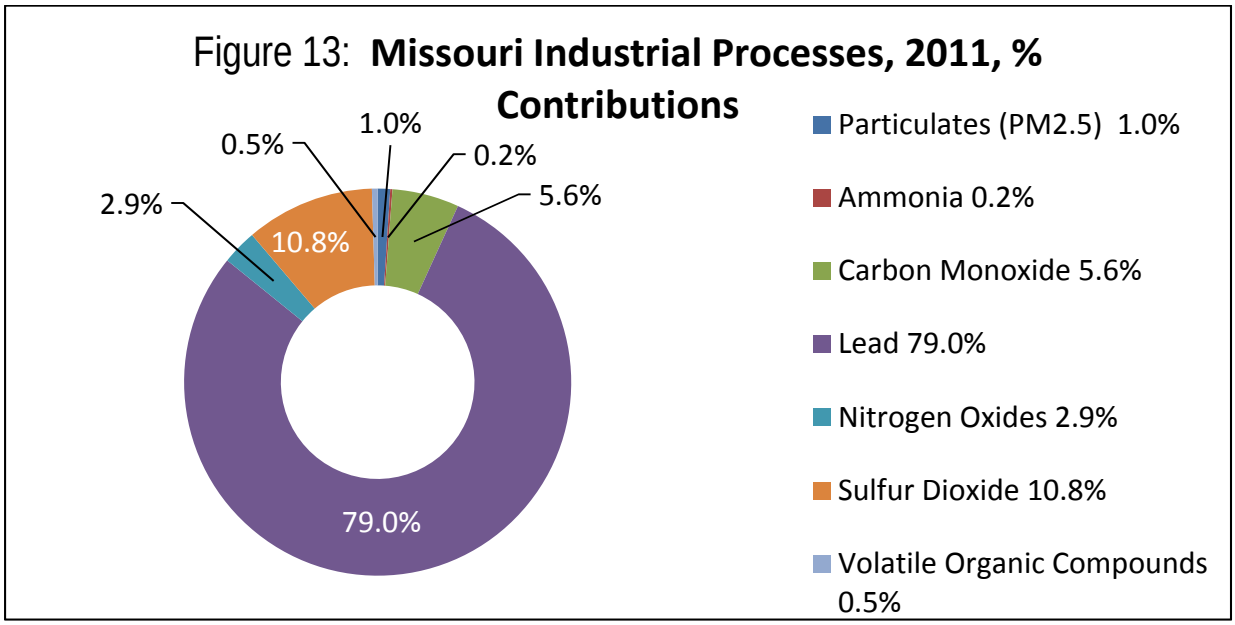


Figure 14 represents Springfield's industrial air emissions from 2002 through 2012. All levels of Air Quality Index pollutants have dropped during that timeframe, with the assistance of businesses and leadership paying close attention to regulations and new processes of reducing pollution production.

Figure 14: **Springfield, Missouri Industrial Air Emissions, 2002 - 2012**

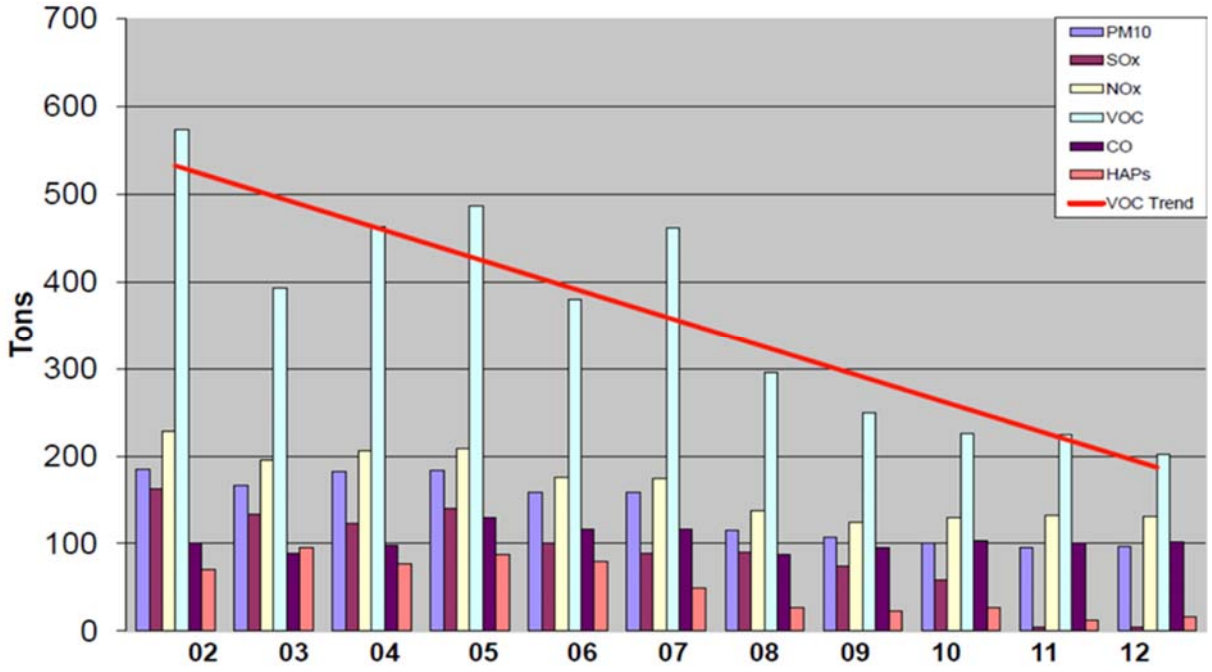


Figure 15 shows the overall reduction in emissions from City Utilities Power Plants from 1980 to 2012.

Figure 15: **Reduction in Emissions from City Utilities Power Plants**

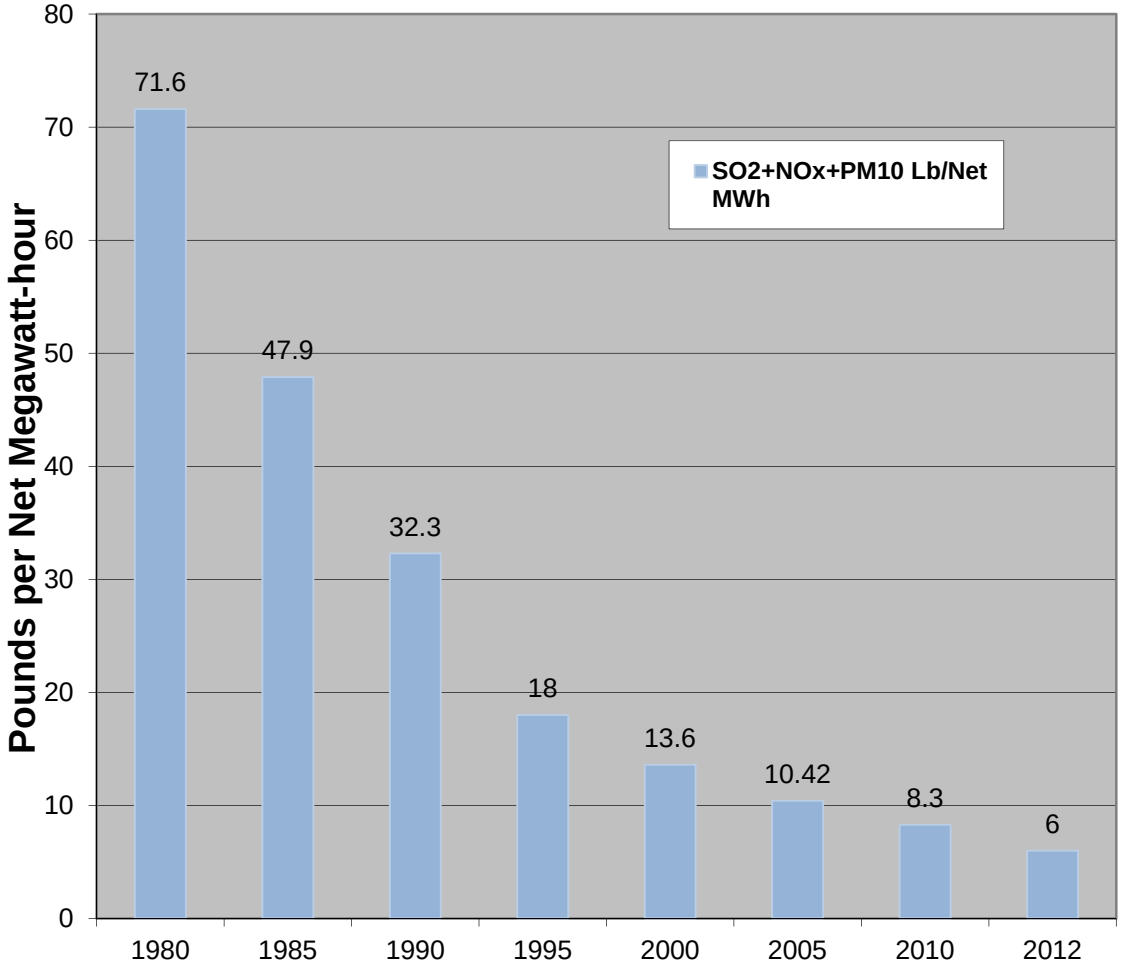
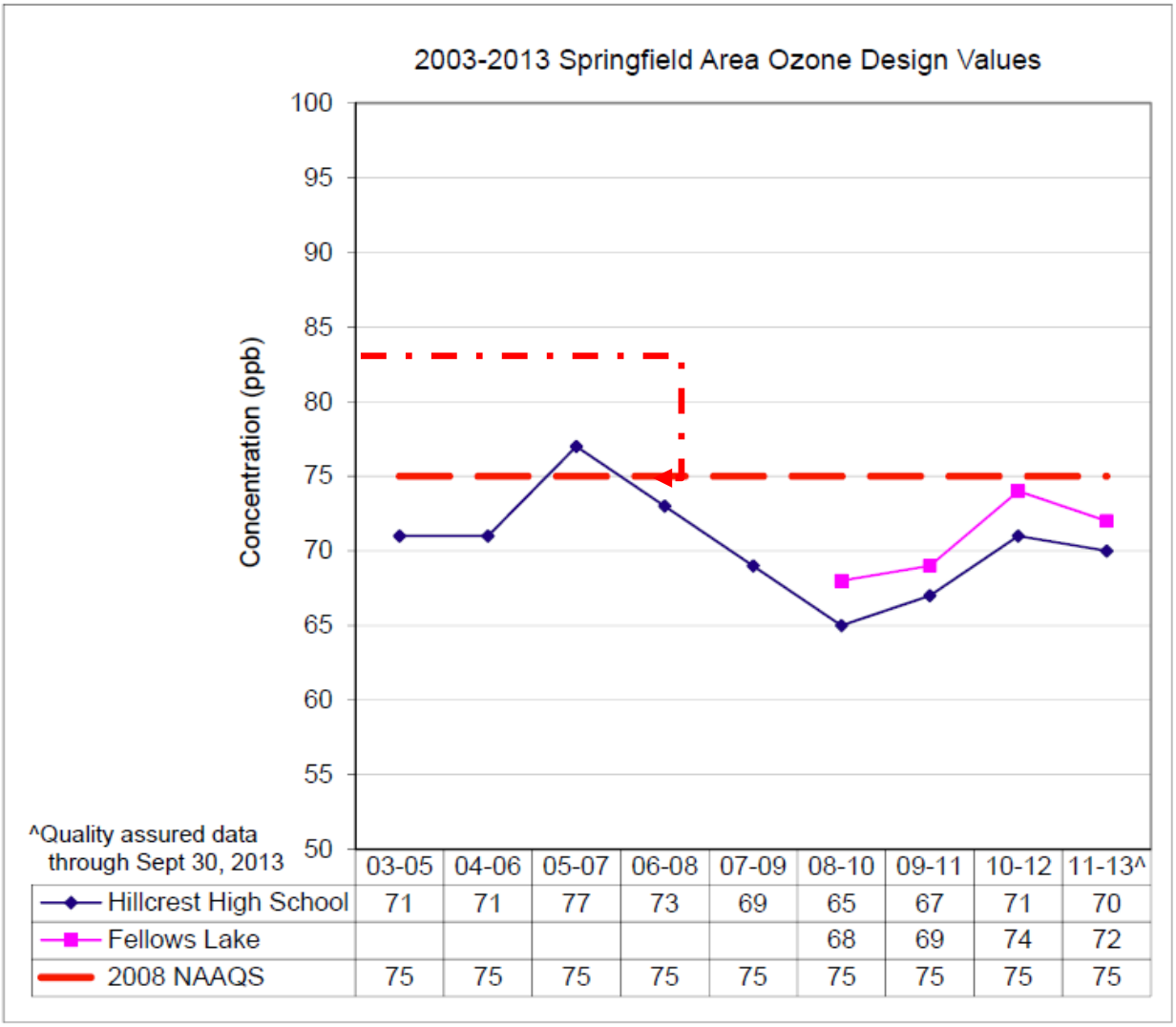


Figure 16 represents the level of ground-level ozone as monitored by the two reporting area stations, Hillcrest High School and Fellows Lake, from 2003 to 2013. The chart includes the federally permissible level of ozone, in red. Springfield, while currently in attainment, is close to going out of attainment, which could result in stricter requirements to cut ground-level ozone production.

Figure 16: **Springfield Missouri Area Ground-level Ozone Design Value Trends, 2003 - 2013**

Ozone



^Quality assured data through Sept 30, 2013

	03-05	04-06	05-07	06-08	07-09	08-10	09-11	10-12	11-13^
Hillcrest High School	71	71	77	73	69	65	67	71	70
Fellows Lake						68	69	74	72
2008 NAAQS	75	75	75	75	75	75	75	75	75

None of the ozone sites, in the Springfield area, violate the 2008 8-hour standard of 75 Parts per Billion. The ozone concentrations have trended down since 2012. This downward trend is noted at all the ozone sites, statewide.

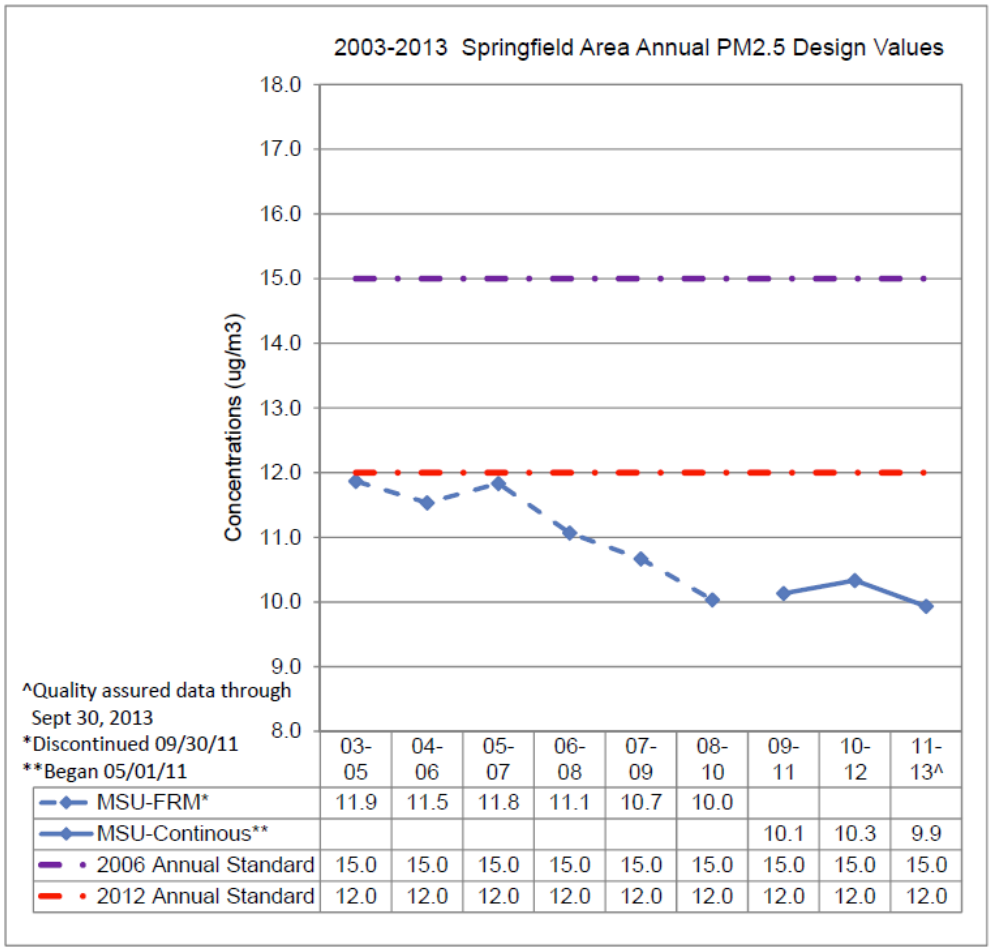
Figure 16: Source: Ozark Clean Air Alliance Clean Air Action Plan, May 2013.

Particulate Matter

Particulate matter emissions in southwest Missouri can come from a variety of sources. Emissions of sulfur dioxide, oxides of nitrogen, and volatile organic compounds are precursors for particulate matter formation, in addition to other natural sources, though their presence cannot be directly correlated to a particulate matter value. Other chemical components to particulate matter include ammonia, organic carbon, and elemental carbon.

Figure 17 shows the particulate matter levels of those particles of 2.5 microns or less in size, during the timeframe from 2003 – 2013. Springfield is currently in attainment of the PM2.5 standard at 12 ug/m3. However, as this chart indicates, the margin of difference has narrowed because of what is being measured as compared to the revised lower PM2.5 standard. The monitors were changed from a regularly scheduled (3 days) collection (MSU-FRM line) to a continuous 24/7 data sample collection process (MSU-continuous). The chart shows the reduction in allowable PM, compared to the continual permissible attainment by the area. Air quality is improving but the challenge is that the standards went from 15 to 12 parts per billion in 2012. Springfield is getting closer to nonattainment as the regulations are made stricter.

Figure 17: **Springfield Area Annual Particulate Matter**



	03-05	04-06	05-07	06-08	07-09	08-10	09-11	10-12	11-13^
MSU-FRM*	11.9	11.5	11.8	11.1	10.7	10.0			
MSU-Continous**							10.1	10.3	9.9
2006 Annual Standard	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
2012 Annual Standard	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0

There are no violations of the new $PM_{2.5}$ annual standard of 12ug/m^3.

Source: Ozark Clean Air Alliance Clean Air Action Plan, May, 2013

What are the air quality challenges?

There is a common misperception that someone else is polluting the air. But much of the man-made pollution is caused by citizens every day activities. As the region grows, meeting air quality standards will become more challenging. More people mean more sources of pollution. Because the sources of pollution are scattered, it is difficult to use regulation to get real improvement. Education and outreach to citizen and business is the key to air quality improvement.

Regulations are also changing and becoming more stringent. Hot, dry weather makes it difficult to meet regulations in the summer months on a consistent basis. One of the major challenges, is the region's air quality is not always dependent upon the efforts of Greene County residents, government agencies and businesses. Air pollution comes to our region from far away so collaboration on a broader scale is important.

In the event the region goes into nonattainment of Air Quality Standards, there may be serious economic impacts. Nonattainment could limit the types of businesses attracted to the region or place additional restrictions on existing businesses. Also, in the event of nonattainment or lack of the required air quality progress, federal transportation dollars for transportation system expansion are at risk.

What are the air quality regulations?

The US Environmental Protection Agency (EPA) sets air quality standards at the federal level. The Missouri Department of Natural Resources also regulates air quality. The following describes these regulations and how they apply to the Springfield region.

National Ambient Air Quality Standards (NAAQS)

The Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards (40 CFR part 50) for pollutants considered harmful to public health and the environment (Figure 12 below). The Clean Air Act identifies two types of national ambient air quality standards. *Primary standards* provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. *Secondary standards* provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

EPA has set National Ambient Air Quality Standards for six principal pollutants, which are called "criteria" pollutants. They are: Ground-level ozone (O3), Carbon monoxide (CO), Lead (PB), Nitrogen dioxide (NO2), Sulfur dioxide (SO2), and Particulate matter. Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air (µg/m3).

Ambient Air Quality Standard Attainment

The Ambient Air Quality Standard for Sulfur Dioxide (SO2) was drastically reduced by the Environmental Protection Agency's direct final rule issued on June 22, 2010. The EPA will require state regulators to perform air dispersion modeling to determine whether Missouri locations will consistently attain the standard. This effort is expected to be completed by late 2014; any non-attainment areas must be in attainment within three years thereafter.

Cross-State Air Pollution Rule

The final 2011 Cross-State Air Pollution Rule (CSAPR) could require significant reductions in nitrogen and sulfur dioxide. The EPA finalized the Cross-State Air Pollution Rule (CSAPR) under the "good neighbor" provision of the Clean Air Act to reduce transported pollution that significantly affects downwind nonattainment and maintenance problems. CSAPR will reduce emissions of SO2 and NOX from power plants in the eastern half of the United States. The rule will reduce fine particle and ozone air pollution, saving lives, preventing illnesses, creating jobs, and protecting communities.

Figure 18 lists the National Ambient Air Quality Standards as of October 2011.

Figure 18**: National Ambient Air Quality Standards (NAAQS)**

Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide [76 FR 54294, Aug 31, 2011]		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead [73 FR 66964, Nov 12, 2008]		primary and secondary	Rolling 3 month average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		primary and secondary	Annual	53 ppb (2)	Annual Mean
Ozone [73 FR 16436, Mar 27, 2008]		primary and secondary	8-hour	0.075 ppm (3)	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution Dec 14, 2012	$PM_{2.5}$	primary	Annual	12 µg/m^3	annual mean, averaged over 3 years
		secondary	Annual	15 µg/m^3	annual mean, averaged over 3 years
		primary and secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]		primary	1-hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Air Pollution Solutions

How are organizations working together to address air quality concerns?

In the Springfield region, the Ozarks Clean Air Alliance, is a working sub-committee of the Environmental Collaborative of the Community Partnership of the Ozarks. The mission of the Partnership is "to create pathways to raise the standard of living and quality of life for all inhabitants, present and future, in Springfield and Greene County." The Alliance is comprised of 35 government, non-profit and non-government agencies from the area. The Alliance produces an annual plan called the Clean Air Action Plan (CAAP). The Clean Air Action Plan is a strategic plan that maps out the efforts that will be pursued to reduce ground-level ozone and particulate matter and improve air quality in our community. The member organizations are involved in educating each other and the public on how to address the health and environmental issues created by air pollution.

What can citizens do to protect air quality?

Household Tips

There are many ways we can assist in reducing the quantity of air pollutants in the region. Here are a few tips. You can find many more on the Ozarks Clean Air Alliance site.

- Trip Chaining – Remember when you got your chores done all at once so you could go out and play? Trip chaining is the same idea – only you'll save the air in addition to saving time. When you start your car after it's been sitting for more than an hour, it pollutes up to five times more than when the engine's warm. That's why combining errands into one sensible trip is more effective and reduces air pollution. This means more time in your life for tasks, less traffic congestion and less pollution – which adds up to cleaner air.

- Maintaining Your Car – A poorly-maintained or malfunctioning car can release as much as 100 times the pollution of a well-maintained car. Keeping your car in top running condition saves money and means less traffic congestion due to breakdowns. Plus, keeping tires properly inflated can increase gas mileage. You see, a well-maintained car releases a fraction of what a poorly-maintained or malfunctioning car emits. And, because vehicles on the road account for more than 25% of all air pollution nationwide, a little maintenance could go a long way to cleaner air.

- Refueling in the Evening – In hot weather, gasoline vapors escape when you refuel your car's gas tank and, combined with sunshine and heat, create ozone, an air pollutant that is harmful to our lungs. By refueling during cooler periods of the day and in the evening, you can reduce ozone pollution. Also, when you gas up, please don't top off the tank. It keeps gas from spilling on you, it's safer, and it helps keep the air clean.

- Choose Alternate Modes of Transportation – Tomorrow, leave home without it. Your car that is. Just once or even twice a week, leave your car parked and get around another way. Try carpooling, taking mass transit, biking, or walking. You'll help reduce traffic congestion and pollution and save money and possibly aggravation.

- Prevent open burning of yard waste by taking it to a City of Springfield "Yardwaste Collection Recycling Center" that will make beneficial compost and mulch. Do not burn trash.

- Maintain gasoline-powered yard equipment by keeping the engine well-tuned so it pollutes less into the air.

How is Air Pollution Connected to Water and Land?

The quality of our air, land and water are all connected. Pollute the air and those pollutants can fall onto the land and be carried into the water during a rainfall. Pollute the land and it can find its way into our streams or groundwater. Pollute the water and it can have impacts both locally and as far away as the Gulf of Mexico. Sources of pollution can be natural or from a variety of human activities. We close this document with an illustration (Figure 19) reminding us how air pollutants are introduced into our air, land, and water.

Figure 19: Air-Land-Water Connection